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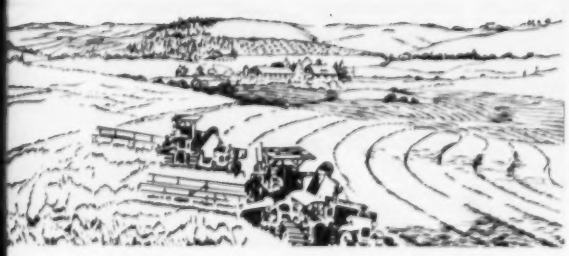

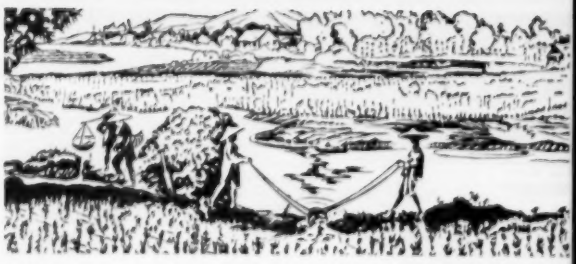

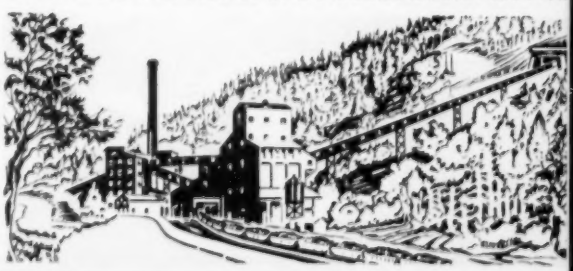

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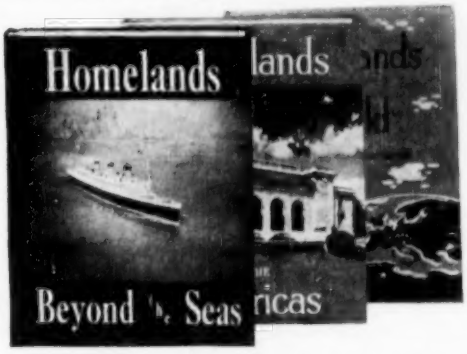

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VOLUME LIV SEPTEMBER 1955 NUMBER 6

NOTES ON THE AMAZON VALLEY*

F. A. CARLSON
The Ohio State University, Columbus, Ohio

An inspiring introduction to the Amazon Region is found in the report, "Exploration of the Valley of the Amazon," by Lieutenant William L. Herndon, published in 1853.[1] In a nautical form the author recorded the daily log of his adventure from Lima, Perú to Belém, Brazil. Altho more than a century has passed it was most impressive to observe the high degree to which Lieutenant Herndon's description of the terrain, hydrographic features and sites of settlements in the Amazon Region is applicable at this time. However, whereas Lieutenant Herndon's interrupted entry into the Upper Amazon from the Pacific Coast, took five months, today a thru trip from Lima to Iquitos can be made in eight days by the overland-water route or three hours by plane. From Iquitos to Belém the flying time is less than 15 hours. This improvement in accessibility has contributed greatly to the growing development of the Amazon Region.

Three major headstreams, the Río Marãnón, the Río, Huallaga and the Río Ucayali unite to form the Río Amazonas. In places the Amazon waters flow in a single meandering channel but for the most part the drainage exhibits an intricate network of streams, associated with sloughs, lakes, islands and marshes. The river gradient is extremely slight, averaging less than 0.15 feet per mile from Iquitos to tidewater at Belém, a distance of approximately 2,100 miles. It has been reported that at Obidos, more than

* In 1953, through a Research Foundation Grant from The Ohio State University, Professor F. A. Carlson made an exploratory survey of the Commerce on the Amazon River.

[1] William Lewis Herndon, *Exploration of the Valley of the Amazon*, Part I. Washington, D.C., 1953. Reprint published by McGraw-Hill Book Company, New York, 1952.

700 miles from the Atlantic Ocean, the river bed lies below sea level.[2]

Altho the longitudinal profile of the Amazon River is nearly flat, the bordering terrain is quite irregular, consisting of not only low-lying plains but also uplands rising to more than 300 feet above flood waters known in Perú as Restingas.[3] These latter are the sites of the river settlements.

During the periodic floods vast areas are inundated. Generally, the time of high water coincides with the season of maximum rainfall, January to June. In the region of Iquitos the flood crest is

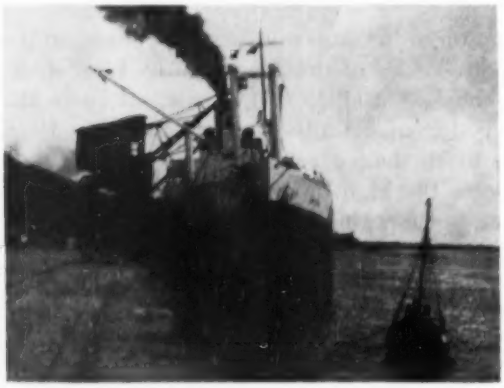

Fig. 1. Port of Belém—a modern entrepôt, receiving and distributing, annually, a total of 600,000 tons of cargo.

reached in May; in the area of Manaus the high water level is in June; and in the Lower Amazon in the socalled "Insular Region," the river begins to rise in October and continues until April. The average difference between high and low water stages are as follows: Iquitos 20 feet, Manaus 40 feet and Belém 14 feet.

The rise and fall of the Amazon waters have considerable bearing on regional activities. Floating docks are essential in some places. At the Port of Manaus, the largest floating dock in the Western Hemisphere and perhaps in the world has been constructed to accommodate a 60 foot rise and fall of the Rio Negro. Rubber tree tapping is limited largely to the season of low water.

[2] Hilgard O'Reilly Sternberg, "The Distribution of Water Power Resources in Brazil with Reference to the Precipitation Ratio Concept." *Annals of the Association of American Geographers*, Vol. 38 (June, 1948), p. 140.

[3] F. R. Fosberg, "Ecological Notes on the Upper Amazon." *Ecology*, Vol. 31, No. 4 (October, 1950), p. 650.

Generally, logging is confined to the period of low water and then, during the flood stage, the log rafts are floated to the mills. The flood plains with the seasonal replenishment of plant nutrients due to silting are the chosen areas for the cultivation of manioc or yuca, rice, beans, corn, jute and other crops. In fertility, the recent alluvial soils are generally far superior to the upland latosols.

Unprecedented floods occurred in 1953 causing loss of livestock, crops and property. There was a great deal of suffering on the part of the poor who have their huts on the river banks in the flooded areas. An unforgettable sight was a view from a low flying Catalina plane in the vicinity of the confluence of the Rio Negro and the Rio Amazonas. The surface was a mosaic of green forests; an amazing expanse of flood waters; tops of partially inundated clusters of palm thatched-roof huts; rafts on which cattle and hogs had been corralled; and ocean-going vessels and dugout canoes plying the same uncontrolled waters.

An International Waterway

In Manaus stands an imposing monument in commemoration of the internationalization of the Amazon River. Of course, foreign

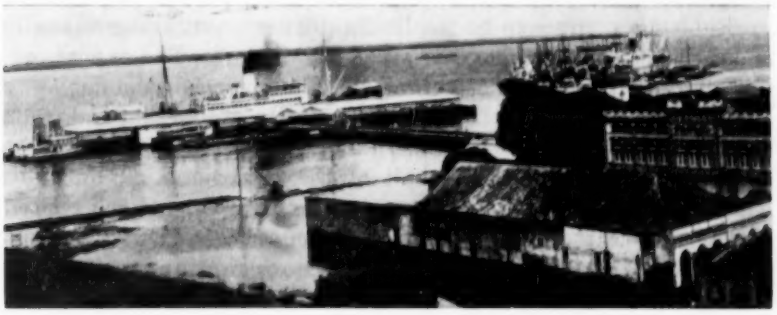

FIG. 2. Port of Manaus on the Rio Negro.

flag vessels are not allowed to transport cargo from one Brazilian or Peruvian port to another port in the same country. They can handle transit cargo, import and export freight from any port in the region to or from a foreign country.

It has been estimated that within the Amazon Basin there are 15,000 miles of navigable waterways of which some 2,100 miles are contained in the Amazon River. Ocean-going vessels call at Manaus,

1,000 miles from Belém and both wood and oil burning river steamers of less than 1,000 tons deadweight can navigate the entire Amazon River (Fig. 2).

Despite the importance of river transportation in the Amazon Region the service is far from adequate. However, the Brazilian government has announced that contracts have been signed for the construction of nine additional passenger-cargo vessels. Of even greater need are roads from the waterways to inland areas. At present there are less than 3,000 miles of road beyond the community limits and only some 500 miles of railways in the entire Amazon Region.

Production and Commerce

The commerce of the Amazon Region is based, primarily, on the exportation of raw and semi-processed materials and the importation of consumer goods. Probably as high as 75 per cent of the Region's production is exported and 80 per cent of its consumption is imported. In terms of value the leading exports are rubber, Brazil nuts, rosewood oil, gums, jute fiber, dried fish, hides and skins and lumber, and among the chief imports are fuels, food products and textiles.

Rubber continues to be the leading export, averaging annually about 25 per cent of the total value of all exports. The annual output of rubber is about 30,000 tons. All Brazilian Amazon rubber is shipped to southeastern Brazil and the entire production and trade in rubber is under the control of the Amazon Credit Bank. The Bank was organized as a result of the Brazilian-United States Rubber Agreement in 1942[4] to carry on banking operations related directly or indirectly to industrial, commercial and other production activities of the Brazilian Amazon Region and principally those concerning the trade and industrialization of rubber. No exportation of rubber can be made by private producers since the Bank is the only channel for exportation of this product in Brazilian territory.

In addition to rubber, four other forest products are among the principal Amazon exports namely: Brazil nuts, gums, rosewood oil and lumber. Particular interest is directed to a greater and

[4] According to the latest statement of the Amazon Credit Bank, December 1952, the 150,000 shares of common stock are held as follows: 60,000 by the United States Reconstruction Finance Corporation, 89,772 by the Brazilian Government and the remaining 228 by Brazilian Nationals.

more efficient use of the immense lumber potentiality. Present deterrents are great distances from markets, lack of logging roads, obsolete equipment and mill operations, need for a clarification of standards and classes of woods and difficulties in securing capital. One of the few exceptions is the Astoria Mills, located at the junction of the Nanay and Amazon Rivers in Perú. These mills specialize in the milling of mahogany and cedar logs floated down the Ucayali and Amazon waters to Astoria, a distance of 500 miles. Milled mahogany is shipped to the United States and Europe and the milled cedar is transported to Callao, Perú via the Panama Canal, a distance of some 6,000 miles.

A possible new adventure in the use of the forest resources of the Amazon Region is the production of wood pulp. Plans call for construction of pulp mills; one on the Island of Marajó, a second, near the mouth of the Madeira River, and a third in the vicinity of Manaus.

Whereas observations were limited, primarily, to views from airplanes and river trips, it was apparent that there are extensive savanna lands in the Amazon Region. Also, it appeared that Tropical Rainforests or Selvas occur on both the upland and low lying flood plains, however, the flora of each was quite different, probably due to drainage conditions. Along the rivers considerable deforestation has taken place, the result of a century or more of exploitation to supply fuel for river steamers, homes and even electric generating stations such as the municipal plant at Manaus. Also, this deforestation has resulted in part from the cleaning of land for crop agriculture and the felling of timber for the saw mills. In areas of second growth there persists typical tropical jungles of interlocking trees, vines, bushes and ferns. The virgin forest consists of tall trees with spreading crowns with bromeliads and lianas. These trees have few lower branches. However, contrary to a former opinion the damp floor of the Selva was not free from dense undergrowth even tho only a dim light penetrates the over-head forest cover. It has been stated that there are more than 2,500 species of trees in the Amazon Region and as many as 150 species to an acre.[5]

One of the more recent developments in the Amazon Region is the increased production of jute. Production has grown from 9 tons in 1936 to 40,000 tons in 1953 with an all time high of 50,000 tons in

[5] W. R. Schreiber, *The Amazon Basin Brazil Nut Industry*. Foreign Agriculture Report No. 49, June, 1950, p. 16.

1951. Producers claim that within the next two or three years jute will be available in quantities not only sufficient for Brazil's needs but also for export. Two jute mills are under construction, one at Manaus and the other at Santarém. The output not exported will be used for bagging Brazil nuts, alligator skins, dried fish and other regional products.

An outstanding deficiency in the economy of the Amazon Region, one that is revealed in the nature of the imports, is the inadequate production of essential foods. A major portion of such items as rice and beans are imported largely from southeastern Brazil. This food problem will become more serious as the population of the region increases; and, it is apparent that it will increase because the National Government is encouraging Amazonian immigration, particularly from Northeast Brazil. In regard to this problem agronomists agree that the upland humid tropical soils in deforested areas under natural conditions become low in plant nutrients due to the rapid rate of humification, leaching and eluviation. However with shift of Amazonian agriculture to the more fertile floodplain-alluvial soils, there should be an increase in the production of food crops.

Due to Federal regulations and limited known field work, little information is available concerning the mineral resources of the Amazon Region. However, it is known that in eastern Perú, more specifically in the basin of the Pachitea River, a tributary of the Ucayali River, there are a number of oil producing wells and at Aguas Calientes there is a small refinery. The output is transported to Iquitos and Manaus. An oil refinery is now under construction at Manaus. The first shipment of manganese ore, some 800 tons, was made recently from the Amazon Port Itaquatiara.

Ports and Settlements

Estimates of the total population of the Amazon Region range from two to three million of which 474,000 live in the three major Port cities, Belém (261,000), Manaus (143,000) and Iquitos (70,000). In addition to a number of smaller communities, such as Santarém, Parintins and Itaquatiara, there are a great many other river settlements consisting for the most part of clusters of palm thatched-roof huts.

Belém, an entrepôt of major regional importance, is favored with excellent natural harbor features and equipped with extensive modern docks and warehouses. Annually there are handled about

400,000 tons of imports and 200,000 tons of exports. Approximately 35 per cent of the total imports originate in other countries and about 20 per cent of the exports are destined for foreign lands.[6] Based on value the principal Belém imports from other regions in Brazil are sugar, rubber, coffee, Brazil nuts, alligator skins, tobacco, lumber and dairy products. From foreign countries the incoming cargo includes such leading commodities as gasoline, kerosene, lubricating oils, automobiles, textiles, machinery, cement and hardware.

CLIMATIC DATA[1]

(Rainfall in Inches)

	Belém	*Santarém*	*Manaus*	*Iquitos*
Jan.	9.2	8.2	9.8	9.2
Feb.	13.6	12.1	9.2	13.8
Mar.	17.3	12.8	9.8	11.9
Apr.	16.7	12.5	8.6	9.0
May	11.7	9.9	7.0	7.7
June	9.1	5.5	3.8	6.6
July	3.1	2.8	2.3	5.4
Aug.	3.0	1.5	1.4	5.5
Sept.	1.8	1.1	2.0	4.5
Oct.	3.3	2.0	4.1	8.3
Nov.	1.1	2.6	6.1	6.8
Dec.	4.2	4.7	7.8	7.5
Year	94.1	75.7	71.9	96.2
Period of Record	1912-1914	1914-1918 1934-1940	1902-1941	1950-1952

[1] Temperature—Annual mean Max. 88° F and mean mim. 72° F (Approx.) the same for each of the above stations.

Not only is Belém the major Amazon River port for both ocean and river vessels but it also is the focal center of air transportation with the United States. Also, daily air service is available between Belém and Rio de Janeiro and there are 12 flights weekly between Belém and Manaus.

Some 700 miles from Belém is the well-known port of Santarém. In 1927, the Ford Motor Company's rubber plantation project at Fordlandia and later another at Belterra, both in the Tapajós River Valley, brought attention to Santarém.[7] Due to its geographic position at the confluence of the Tapajós and Amazon Rivers Santarém plays a significant role as a receiving and distributing center for the Tapajós region. Main exports handled at Santarém are jute fiber, Brazil nuts, rosewood oil, lumber and rubber.

[6] The United States receives about 20 per cent of Belém's foreign shipments.

[7] A few years ago the Ford rubber plantations in the Amazon Region were turned over to the Brazilian Government.

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May	11.7	9.9	7.0	7.7
June	9.1	5.5	3.8	6.6
July	3.1	2.8	2.3	5.4
Aug.	3.0	1.5	1.4	5.5
Sept.	1.8	1.1	2.0	4.5
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[1] Temperature—Annual mean Max. 88° F and mean mim. 72° F (Approx.) the same for each of the above stations.

Not only is Belém the major Amazon River port for both ocean and river vessels but it also is the focal center of air transportation with the United States. Also, daily air service is available between Belém and Rio de Janeiro and there are 12 flights weekly between Belém and Manaus.

Some 700 miles from Belém is the well-known port of Santarém. In 1927, the Ford Motor Company's rubber plantation project at Fordlandia and later another at Belterra, both in the Tapajós River Valley, brought attention to Santarém.[7] Due to its geographic position at the confluence of the Tapajós and Amazon Rivers Santarém plays a significant role as a receiving and distributing center for the Tapajós region. Main exports handled at Santarém are jute fiber, Brazil nuts, rosewood oil, lumber and rubber.

[6] The United States receives about 20 per cent of Belém's foreign shipments.

[7] A few years ago the Ford rubber plantations in the Amazon Region were turned over to the Brazilian Government.

In the heart of the Amazon Region is the renowned Port Manaus. Its urban structure reflects days of prosperity, decadence and rejuvenation. From about 1825-1897, and reaching its peak in 1909-1912, the period of the Amazon Rubber supremacy, Manaus experienced a glamour which was not unlike that of some gold rush booms in North America. Following the abrupt collapse of the Brazilian rubber economy, 1912-1914, Manaus subsided into a stage of depression and decadence which continued more or less until the beginning of World War II. With the renewed interest in the rubber potentiality in the Amazon Region in 1942, as well as the promotion of new economic activities, Manaus entered a new era of a progressive and expanding economy. Also the accessibility of Manaus has been greatly improved by direct air transportation with Belém, Rio de Janeiro and Iquitos.

The river commerce of Manaus is, in composition, quite similar to that of Belém; however, the volume is much less, averaging annually a total of some 100,000 tons.

Iquitos is the only urban center in the entire Upper Amazon Region. The settlement located at the mouth of Río Itaya, has grown from a small fishing village to a city with a population of 70,000. At an early date Iquitos developed into a Amazon outpost where the East and West met, a position it still retains. The major exports are mahogany, *barbasco, lechi caspi,* dried skins and small amounts of coffee and cotton.

A water-land route extends from Iquitos to Lima. Two deck-wood burning steamers ply between Iquitos and Pucallpa, the latter a town of 12,000 inhabitants located at the head of navigation on the Río Ucayali. From Pucallpa an unimproved road of some 530 miles leads to Lima, via Tingo Maria, Huanuco, Cerro de Pasco and Oroya, rising to a maximum elevation of about 16,000 feet above sea level. Generally it requires about eight days to make this trip between Iquitos and Lima.

A Growing Economy

Any attempt to evaluate the economic potentiality of the Amazon Region is weakened by a lack of information concerning the extent and degree to which its raw materials can be utilized. However, in the light of the present development, research and national interest there is justification for predicting an expanding economy. Contributions to the control and the eradication of some plant diseases and the implementation of new methods of tropical agricul-

ture as a result of work performed by the Northern Agricultural Institute at Belém promise to be vital forces toward greater progress. The cognizance of the Amazon countries, particularly Brazil and Perú, that the Amazon Region can be an important part of

FIG. 3. A scene near the confluence of the Río Itaya and the Amazon Rivers.

their national economy, is another factor in favor of further development. For example, in 1946 the Brazil Government in accordance with its national policy to direct greater interest in its undeveloped areas established three new territories in the Amazon Region, Amapá, Rio Branco and Guapore. Also, a plan for the improvement of transportation, public health, education, agriculture and social service in the Amazon Region has been adopted by the Brazilian National Congress.[5] In carrying out the "Plan for rehabilitation of the Amazon Basin," the Federal Government may use for at least 20 years an amount of not less than three per cent

[5] "The Amazon Valorization Plan" was established by Law, January 6, 1953. It will handle funds representing three per cent of the total yearly National income during a period of 20 years as prescribed in Brazil's Federal Constitution of 1950. Reports indicate that some phases of the Plan will be implemented in 1954.

of its total tax revenue. In somewhat a similar manner, Perú is engaged in supporting colonization by extending aid to agricultural, transportation, health and education projects in the Upper Amazon Region.

The opinion has been voiced that the number one problem in the Amazon Region is its sparse population. It appears, however, that it is not only a question of numbers but also the degree of productivity of its present inhabitants. Reference is specifically applied to the more remote river settlements. Some of the occupants of these settlements are employed in logging camps and other forest and river activities but most of the folks live a life of subsistence based on fishing, hunting and primitive agriculture. How to integrate these river folks into the growing economy of the Region is a major Amazonian problem.

DISTORTED MAPS, A TEACHING DEVICE

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Among the useful visual tools available to the teacher are maps and graphs; one shows relative position, the other comparative importance. The two can be combined in distorted maps, in which familiar shapes and locations are retained but in which the size of the units varies according to the relative importance in some feature, such as population, wheat production, or industrial output.

In a map of the United States, for example, the size of each state can be made proportional not to the area but to employment in manufacturing (Fig. 1). The differences between such a distorted map and a conventional area map strike the eye and stimulate observation, questioning, and discussion. In such a map Chicago crowds closely on Los Angeles. What happens to the intervening spaces? Why is there so little manufacturing in them? A single urbanized unit, the New York Metropolitan Area, looms larger than the entire Southeast. New Jersey exceeds Texas in size. Urban areas overwhelm rural ones.

On a map of mechanized agriculture (Fig. 2), in which the

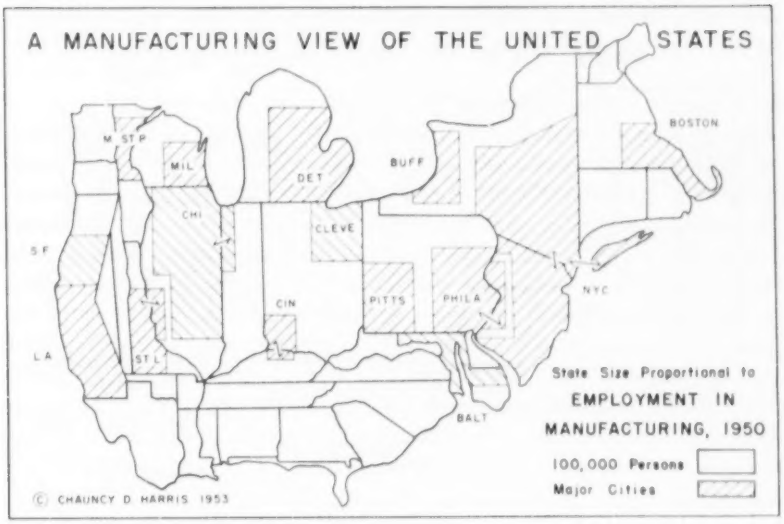

FIG. 1. A Manufacturing View of the United States. The size of each state is proportional to the number employed in manufacturing in 1950. Major metropolitan areas are indicated by shading. Some extend into more than one state. Because of tiny size, the Mountain States have been grouped into a single triangular unit; the Prairie States have also been grouped.

sizes of the states are made proportional to the number of tractors, the United States acquires quite a different look. The cities disappear. The Corn Belt states from Iowa to Ohio dominate the stage.

A comparison of these two maps reveals significant contrasts in the United States as it might be viewed by an industrialist, by a farmer, or by a politician appraising the relative weight to be given the various states in legislation that might affect manufacturing in one case or farming in the other.

World maps distorted according to population or national income provide startling contrasts both with conventional area maps and with each other.

Two objections are made against such cartograms. First, data may be expressed more exactly in tables or graphs. But both of these fail to convey the location factor. Secondly, it is asserted that people simply don't know the states or countries anyway, so won't sense the distortions involved. This criticism, alas, too often is true. Insofar as the viewer does not even know the identity of the areal

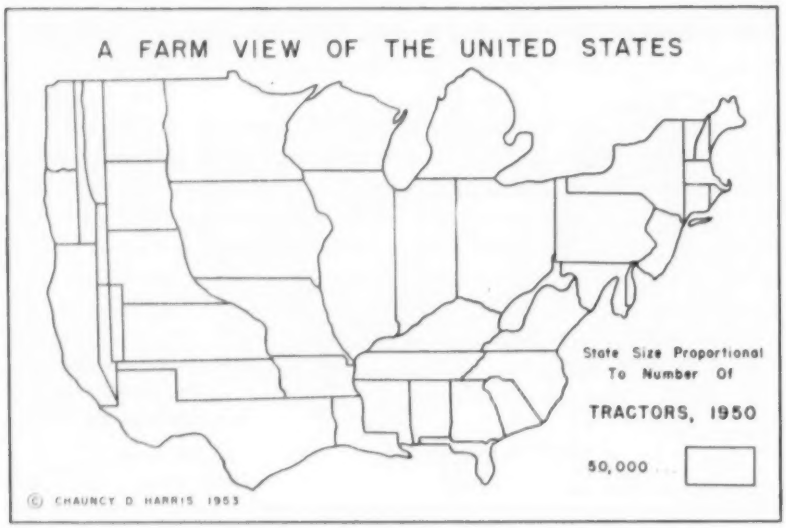

Fig. 2. A Farm View of the United States as seen by the tractor manufacturer. The size of each state is proportional to the number of tractors in 1950.

units involved, the map loses much of its point. The second criticism is often irrelevant, however, since the purpose may be not to demonstrate how much New Jersey is expanded or contracted but rather to express its importance relative to other states in some specific respect; furthermore, the states or other areas can be named on the map, if considered necessary.

Construction

Such distortion maps are relatively easy to construct. The following hints may be helpful. First the over-all size of the map is determined. The total quantity to be shown is then divided by the area. For example, if 160 million people are to be represented on a map of 32 square inches, the scale would be 5 million persons per square inch. Then the area of each unit is made proportional to its appropriate figure. In drawing such a map it is useful to utilize tracing paper laid over cross-section paper ruled in both directions with ten divisions to the inch. Each square on the paper then is a hundredth of a square inch. By counting these small squares, areas of various sizes can be measured without elaborate calculations. Thus in the above population map a state with one million people

should cover two-tenths, or twenty-hundredths, of a square inch. Its area is easily adjusted to cover 20 squares on the cross-section paper.

The problem is to preserve the approximate shape as nearly as possible and to include little recognition symbols such as the panhandle of Texas, or Cape Cod in Massachusetts, or characteristic river boundaries such as those along the Mississippi River. In order to get the states to fit together, they must be adjusted by varying the distortions in the two directions. Thus in Ohio and Indiana, if the northern straight-line boundary and the southern river boundary are to be kept aligned, the relative importance of the two states with respect to each other must be shown by variations in the east-west width. It is generally best to begin the map somewhere near the middle and work outward and also to start with units of moderate size rather than with the largest or smallest units to be shown. In order to aid recognition, all lines, whether straight or curved, should have, insofar as possible, the same orientation as on conventional maps.

MAPS THE BLIND CAN SEE

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American cartographers are increasingly concerned with the development of more effective and useful maps. To this end, a whole field of specialization in cartographic research, called *Map Psychology*, is developing. Primary concern is being given to the evaluation of all the elements of map design, color, type style and size, the whole range of symbolism, as well as the relationships between all these elements in the map complex itself. Invariably all these problems make necessary an evaluation of the psychological reactions of the average map viewer. In truth cartographers are faced with measuring both the psychological and the physiological reactions in order to achieve the most effective finished product. Quite naturally the writings of Robinson, Harrison, Wright and others deal with the visual problems of map design. Almost no attention, however, has been given to the theoretical and practical problems of designing and producing maps for the "blind." It seems to me that here exists a minority of the world's

population which, in terms of day to day living, has a greater need for both large and small scale maps than any other segment of the world's people. It is for this reason that I have embarked on a research program designed to discover some fundamental principles involved in designing and producing maps for the blind.

It is my purpose here 1. to report on the first step in this research and 2. to discuss some of the problems involved as well as some of the implications their solutions would have in the production of braille and braille-like map aids for the blind.

There are from twelve to fifteen blind students registered at the University of Washington each year. All of the students have experienced difficulty in learning to find their way from one building to another and until recently no ready solution to their difficulty has been available. Three years ago a representative came to me with the idea of making some sort of a map of the campus for the blind. This seemed practical, and as a result four students and I took on the problem with the hope of finding a solution. With the thought that our experience may give some of you ideas concerning similar projects which you might undertake I will outline briefly how this map grew from an idea to an actuality.

I first obtained a copy of the most recent campus map from which a slide was made. The slide was then projected on a piece of plywood four by six feet in size and the image was traced. We thus obtained a large scale base map on the material to be used in making the map.

The intricate pattern of roads, paths, buildings, and obstructions posed quite a problem. Being novices, in terms of this type of map, neither the students nor I were hampered by any preconceived theories or conventions. We therefore based our thinking on the proven sensory qualities of different surface textures and attempted to utilize them in order to differentiate between the various elements of this campus map.

We first attacked the problem of how to portray the buildings. This was accomplished by using quarter inch balsa wood and cutting out each building horizontally to scale, and gluing them in position to the map base. None were vertically to scale but this was done deliberately so that the blind could get their fingers between and around the buildings to follow roads and paths.

Next came roads, walks and paths. These proved rather difficult because in many instances paths and walks were right beside

roads and parking lots. We therefore obtained two grades of sand paper, one very coarse for streets and roads and one rather fine for walks and paths. These strips were cut and glued to the base. Steps on walks and paths were shown by driving paper staples across the strip of sand paper, one staple for each step. Immediately after finishing this phase of the map, several blind students were invited to test these symbols. They had no trouble whatever in distinguishing the texture differences and within about five minutes were able to find their way all over the map.

The map continued to develop along these lines. Thumb tacks were used to indicate the shore line on the south and east margin of the campus. Copper wire was glued to the base to indicate railroad tracks. We used small triangular pieces of balsa for the bridges over the railroad and two streets. After the addition of each new set of symbols several blind students were asked to come in and check our work to see whether the symbols were well differentiated. Their reactions were such that each visit gave us new enthusiasm and energy.

The most difficult stage was reached after all the symbols had been applied because it was then necessary to find some means to identify the names of all the buildings as well as the streets which immediately surround the campus. Braille symbols had to be used but the problem was in how to apply them. We first tried embossing thin pieces of clear plastic with a hand stylus but had to abandon this procedure. Instead I obtained brass escutcheon pins with round convex heads and drove them into the plywood base so that groups formed individual braille letter cells. In this way it was possible to identify all of the buildings and streets.

A legend for the map is now being made from sheets of thin plywood on which samples of each symbol are being mounted and identified in braille. In other words, the map is designed to be self-explanatory to the blind user even to directional orientation which is provided for by a large north arrow cut out of balsa and mounted on the base.

The plan is to install this campus map in the Student Union Building and thus make it available to all students, not only the blind. Following a conviction that dual use of such maps (both by blind and sighted people) should be possible, we are also identifying all buildings and streets with ordinary lettering and painting the map in different colors.

Altho we found it was not necessary, a locational coordinate system could have been added by using fine wire regularly spaced and intersecting at right angles. Vertical wires could be identified by braille and printed numbers and the horizontal by letters, or vice versa. Other textural differentiations could have been produced by spreading glue over the surface and sprinkling with sawdust or any other of the many materials available. In fact, this would make possible an even wider variety of differentiations than was necessary on this map. A great deal of experimental and testing work could well be done on the measurement of sensory differences of different texturing materials.

When the campus map is finally displayed this fall, it will be equally usable by sighted and blind students, a dual purpose map. The total cost for materials has been about $7.00 of which the biggest single item was the plywood for the base. Altho the total labor time was large, about 200 hours, the character of the work was such that, with supervision, almost anyone could carry it out satisfactorily. This in itself is an important factor because it indicates that such maps could be made in a variety of situations and by almost any group. Particularly is this true in public schools where material and equipment costs are often more important considerations than that of labor.

From the standpoint of public school teachers, a project similar to our campus map could easily make an excellent student project. It is an academically sound problem because it would give students experience and knowledge in map layout, determining scale, designing symbols and measuring the success of their decisions. It is the type of project which would receive wide interest both within the school and the community. Its community service implications are obvious and in addition it would give sighted children a better understanding of the problems of the blind. In the necessary contact with blind individuals an entirely new attitude toward blindness as a handicap could be engendered. Sighted students are constantly amazed at the seemingly normal abilities of the blind when they are provided with adequate sensory devices. Such experiences and new knowledge obtained by sighted children might be a very potent factor in removing both public apathy and public misconceptions toward the blind. Finally, altho less tangible, would be the great satisfaction students would have in seeing successful use made of a map which they themselves have carried out.

What we have accomplished and the techniques which were developed are relatively less important than the questions and the *ideas* which were stimulated by this project. The implications are so numerous that I can only suggest a few which are the most obvious. We have begun and will be carrying on research on maps for the blind for some years to come, and what I am about to say can only be considered as a progress report.

An examination of the literature concerning sensory devices for the blind reveals little if any attention to the problem of maps. As is to be expected most of the work (practical production) has been carried on by non-cartographers. At this time, to my knowledge, there is not one professional cartographer actively doing research on this problem. It is also clear that almost all of the map production has been either relief maps and relief map puzzles or simple embossed maps at small scale. The Howe Memorial Press and one or two other printers of material for the blind, publish a number of maps. At least two national toy manufacturers produce both relief and puzzle maps for the blind. These last, however, are so expensive that their use is virtually limited to institutional rather than private use. In other words, despite all the attention (guide dogs, improved canes, human guide services, etc.) given to improve the blind individual's ability to get around, very little attention has been directed at improving and producing large varieties of maps for their use. This, of course, does not point up the need for maps for educational purposes. Since I insist that geography cannot be taught well without the use of maps, it becomes then a problem which teachers of geography might well help to fill.

I have become convinced that the average blind person who can read braille, moon, or ordinary line letter type is capable of distinguishing much more in map detail than is commonly thought. This would be true only if all map symbolism were designed so that sharp sensory differentiation were possible. Thus it becomes evident that a basic need is research which is designed to produce in the end a series of tested map symbols which parallels those used on maps for the sighted individual. I argue that insofar as it is practical, standard symbols, such as those described by official map publishing agencies of the Federal government, be used as models and only discarded when it is proved by testing that they are unsatisfactory. Only then should innovations in symbolism be tried. Here again there is almost complete lack of published research. How

large must dots be and how far apart can they be placed before they become confusing to the blind reader? How close can double parallel lines be and how heavy to remain distinguishable? What is the relationship between digital sensitivity and line weight, and how much difference in the diameter of a circle must be maintained in order for the blind reader to distinguish the difference? These and many more such questions about maps must be answered and to my present knowledge they cannot now be answered.

I am a novice at all this but I am hoping that my ignorance may allow a fresh approach to the whole problem not limited by conventions. In seeking an answer to the logical questions which are posed it seems to me that at least three different objectives might be attained:

1. The development of techniques for measuring sensory and psychological reactions to braille and braille-like symbols.
2. The successful production of a wide variety of maps for the blind.
3. The discovery of some fundamental laws which might be equally operative in designing maps for both blind and sighted people.

There is a fourth possibility. That is the experimental development of an improved method of reproducing maps for the blind. If this is possible it would have some very important implications, for a reproduction process satisfactory for maps should be equally applicable to musical, mathematical, and engineering drawing symbols as well as braille letter printing.

I feel reasonably sure that any one of the standard wall maps published for classroom use could be converted very easily to blind use. None are particularly complex in terms of symbols or content. However, probably only one level of sensory acceptance could be maintained as compared to at least three visual levels which, thru proper design, could be maintained on wall maps for sighted individuals. More complex problems in design will be encountered on larger scale more detailed maps for the blind. One of their pressing needs is for city or neighborhood maps which are not bulky in size. This will require a careful analysis of digital sensitivity and ability to differentiate between different textures and types of lines. But I hope that such problems can be solved.

The possibility of producing dual-use maps is of course an important consideration for many reasons, but particularly in terms of training in map reading for the blind. In many cases sighted teachers are working with blind children and if the maps in use are equally and readily usable by the teacher the whole process could

be improved and accelerated. This would be especially important if the trend toward non-segregation of the blind child continues to grow. In such a case one set of maps could be used for all purposes, thus facilitating map use for both sighted and blind students as well as reducing costs of instructional equipment. The blind student will require as much if not more training in learning to use maps and will undoubtedly be a more consistent user once he has learned how to use them.

SOME NOTES ON THE 1954 SUMMER FLOODS IN IRAN*

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A LAND OF VARIED AND UNRELIABLE PRECIPITATION

Most of Iran is a semi-arid country with an average annual precipitation of about 16 inches: however precipitation varies widely ranging from 80 inches on the southwestern shores of the Caspian to the negligible figure of two inches in parts of the interior desert. Everywhere seasonality is a striking feature of the precipitation. A great proportion of the country receives the major part of its annual rainfall during the winter season. The percentage of winter precipitation varies from 75 per cent of the annual total in the southern and central sections to 25 per cent in the northwest. Winter rains are mostly cyclonic in nature and the actual distribution of the rainfall is related to the relief of the country. Consequently the northern and western highlands receive more rainfall than the more level lands of the interior and the east.

With the advance of the spring season, cyclonic activity is reduced but the rapid heating of the moist air over the snowclad plateau areas produces a considerable amount of convectional showers. As a result, some of the highlands in the north and west receive between 25 per cent to 50 per cent of their annual precipitation during this season. Convectional showers that characterize the spring weather of most of Iran are at their maximum in late March, April and early May. Summers are invariably dry and rainless all over the country except along the narrow coastal plain

* Written late in August, 1954.

to the south of the Caspian Sea and the adjacent northern slopes of the Elburz Mountains. Since the chances of summer rains are remote, Iranians spend most of the summer-time (except, of course, the hot mid-day hours) outdoors, and the open air "way of life" is a common feature of the country thruout the summer months.

Precipitation is extremely variable over most of the Iranian Plateau. In fact, the narrow Caspian littoral is the only section that enjoys a fairly assured amount of rain every year. The annual variability ranges from 12 per cent to 70 per cent but seasonal and monthly variability has a much wider range. Stations in the desert section, with available records over a 15-year period, show a seasonal variability of nearly 100 per cent. The direct results of such great variabilities are the frequent droughts and floods to which Iran, or parts thereof, are subject from time to time. Floods are of common occurrence in the spring months and their ill effects and damages are greatly intensified by the barren nature of the terrain and also by the fact that human settlements are generally located on the alluvial fans or piedmont alluvial plains that fringe the mountain ranges.

Summer floods are rare in Iran and when they occur, they are of local character and generally limited to small areas. However, the floods under consideration, namely those that have recently hit the country, are quite unprecedented both in the extent of damage and in the extensive area that they have covered.

Reports published in the Teheran newspapers indicate that between July 28 and August 1, 1954, a wide area comprising the entire northern third of Iran, from the Turkish borders in the west to the frontiers of Afghanistan in the east, was subjected repeatedly to terrific hailstorms and cloudbursts of unusual force, lasting from 5 to 30 minutes (Fig. 1). In some localities less violent but more lasting heavy rainfalls occurred.

The Teheran Catastrophe

A detailed account is available of how the catastrophe began in Teheran and this can be considered as a typical example. Here a suffocating dust storm of gale force heralded the oncoming of the main storm. This dust storm resulted in a number of traffic accidents and actually three lives were lost when the solid iron roof of a three-story building was blown into a street over 50 yards away. Then the lightning began, followed by such torrential down-

pours of rain that in less than 10 minutes all sewage canals were blocked and large areas in the southern section of the capital were flooded. The city power-plant ceased to operate due to excessive mud in the water and the city was without electricity until August 9, 1954.

The damage to property and loss of life was much greater in the suburban mountain resorts, where thousands of city dwellers spend their summers. The valleys of Jajerud and Karaj to the

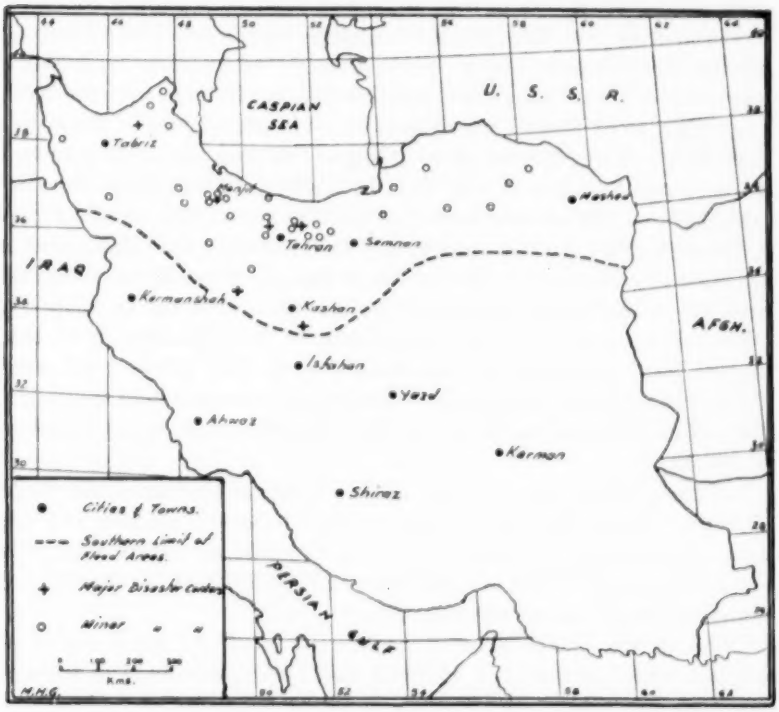

FIG. 1

east and west of Teheran respectively, suffered most because of the denser population. Many country cottages and tents were washed away and numerous people were swept away by the angry torrents before they could run to safety. Mountain roads and bridges were destroyed and telephone lines were cut. Main highways to the northern and western districts, on which the capital

depends for its daily requirements, were also cut off and the isolation thus produced brought shortages not only to the city itself but also deprived the flood-stricken areas of the immediate relief that they might have otherwise received from Teheran.

Great Damage to Fertile Farmland

What happened in Teheran and its neighborhood was repeated on much larger scales in other areas shown on the accompanying map. However, it was in the fertile and relatively populated valley of Safid-Rud that the greatest damage was done. The village of Sirdan (population 1,500) and a number of smaller settlements were the scene of great disaster. Sirdan is not far from the well-known gorge of Menjil where the two main tributaries of the Safid-Rud unite. Here, a total of 19 villages suffered seriously and two were completely wiped out. Of the 38,000 inhabitants of the district, about 7,000 became homeless and the loss of life, as of August 9, totalled 200 with 150 people still unaccounted for. Many tragic scenes were revealed in the course of the relief work that followed and often the badly mutilated bodies were difficult to identify. Olive growing is the main occupation of the inhabitants of this section and altogether no less than 10,000 olive trees, some over 500 years old, were destroyed. The damage to property in this small area alone was estimated to be Rls. 200,000,000 or approximately $5,000,000.

Among other places that suffered on a similar scale were Ghamsar (near Kashan in the center of Iran), Ashtian (to the west of Kashan), Maigun, a very fashionable mountain resort to the northwest of Teheran and Damavand village at the foot of the famed volcanic cone of the same name.

The survey of the flood stricken area as shown on the map is not yet complete but it is believed that hardly a village in the entire area has totally escaped the unhappy consequences of the unwelcomed and untimely rain in a country where every drop of water means so much to the poor farmer.

SOME OBSERVATIONS ON TEACHING GEOGRAPHY AND THE TRAINING OF GEOGRAPHERS AT A COLLEGE OR UNIVERSITY

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Geography teachers have an excellent opportunity to advance the cause of good teaching, since their field has an infinite variety of information and a multiplicity of pedagogic approaches. This combination of myriad teaching techniques and manifold subject matter offers a large number of possible approaches from which to select the best one suited to meet the needs of students and instructors in any given situation. If the instructor is perceptive, well-informed and lucid, there is no reason why any student should not find some aspect of geography interesting to him.

The field of geography, lying as it does, between and overlapping the physical and social sciences, is in an especially fortuitous position to bridge the widening gap between the sciences and the social sciences. One of the greatest contributions which geography can make is to synthesize the information of fringe fields into a meaningful entity. This synthesis or correlation cannot be accomplished unless the geography instructor demonstrates skill in his research and classroom teaching. Nor is synthesis of material his only contribution. At the core of geography is material which is peculiarly geographic, and this "pure" geography must be treated with sympathy and skill by the instructor, or it loses its meaningfulness.

Good teaching techniques and methods of approach, which apply to instruction in all disciplines also apply to geography, but the geographer must develop abilities and methods in addition to those possessed by instructors in other fields. All too often the college professor must combat the reputation which geography has for being dry. To combat this stigma of dullness, the geography instructor must in many instances disprove an onerous reputation. Consequently excellent teaching is his special challenge.

SEQUENCE OF UNIVERSITY GEOGRAPHY INSTRUCTION

No one technique or approach will fit the needs of the geography professor or student at all levels of instruction. The student must be led thru a learning cycle similar to the cycle of erosion. That is,

he must be led thru an erratic youth until he reaches a relatively stable maturity, and finally he must be released to the profession and the world before he has reached the senility of old age.

This progressive development, when related to teaching techniques, often must be tempered by the practicalities of university administration and the vagaries of fund-appropriating bodies. The best compromise between ideal and practical at the beginning level seems to be the lecture method of instruction. Classroom discussion on the freshman-sophomore level should probably be used sparingly, since the average beginning geography student must accumulate a considerable store of geographic knowledge, and must familiarize himself with the geographic vocabulary, before he is capable of contributing much to a class discussion.

At the advanced undergraduate level the percentage of time allotted to lecture should be reduced somewhat, and more time devoted to class discussion. At this stage in his development the student should be encouraged to utilize information acquired in freshman-sophomore courses to develop sound thinking and meritorious geographic hypotheses.

At the beginning of graduate instruction class discussion and report should take an increasing amount of class time, and professorial lectures should be reduced to a minimum. At this stage in his development the student should have acquired an ability to espouse geographic principles and postulate, with a fair degree of accuracy, concerning geographic unknowns. Also, at this level of geographic training, criticism (constructive and destructive) should be unstintingly utilized by the professor. Caustic criticism of foolish statements, half truths, fuzzy thinking, poorly supported arguments and inaccuracies should be employed without qualm. (Both the instructor and fellow graduate students should join in this criticism.) Likewise, clear thinking, substantial research and conscientious effort should be rewarded with praise by instructor and fellow students.

After the master's degree has been obtained the average student has progressed sufficiently so that he can do most of his thinking and development on his own initiative. In this period the instructor's principal efforts should be devoted to guidance of the student's work. The student should be striving for a measure of perfection heretofore unattained. Self-criticism should be at its height, and no novice should feel completely self-satisfied with work

which he has done. The instructor should insist on perfection of detail, polished style and acceptable form in written papers and oral reports.

The student should be cognizant of the multiplicity and complexity of geographic problems, and should be aware of numerous enigmas demanding solution. He should be ambitious enough to set for himself the task of attempting the solution of one or more significant geographic problems.

Thus, the geography student should be led thru four steps of youth leading to geographic maturity on the attainment of the Ph.D. For it is after the attainment of the Ph.D. degree or equivalent study that most geographers come of age. At this stage he should have acquired a stature which enables him to successfully teach and conduct research.

Methods of Approach

Every individual is gifted with a certain amount of skill for almost any job. Obviously, one's inherent capacity for a particular job may be greater than that possessed by others. The *superior* geography instructor is gifted with insight and lucidity which would make him successful in teaching any subject for which he was properly prepared. Most people can develop into *excellent* teachers by the simple expedient of hard work and the consummate desire to excel.

An excellent university or college geography teacher must possess many, perhaps, all, of the following attributes: 1. A thoro and exact knowledge of the subject matter in the fields which he teaches. His exposition must be clear and precise. (The university student has great contempt for professional inaccuracy, and is lulled to sleep by the floundering instructor, unless he stays awake to deflate the pompous say-all, know-nothing windbag.) 2. Material organized into a meaningful sequence—most students desire homogeneity, not heterogeneity. 3. Knowledge and ability to compare and contrast new factual data to things already known by the students. For example, statistical data has little or no meaning unless it can be related to the commonplace in every day living. Further, description of climatological, meteorological or physiographic phenomena has little meaning unless the description is correlated with something in the student's daily experience. 4. A knack for making appropriate use of visual aids. Since geographers are con-

cerned with description and interpretation of earth phenomena, they have an excellent opportunity to make use of slides, motion pictures, maps, globes and charts. These materials should be used at every appropriate opportunity. In a regional course, for example, it is not possible for the professor to do an effective job of teaching without a map. Slides, taken by the lecturer should be used regularly, but he should be careful to restrict the number in any given showing, since the students may be swayed into somnolence in a dark stuffy room. 5. A sketching technique, which will enable him to reproduce maps, charts and block diagrams on the board. Admittedly many geographers will never develop a true artistic ability, but everyone who can write a legible hand can draw well enough to convey his meaning thru this visual means of expression. 6. Interest, knowledge and ability to correlate the geographic content of a course with current events and life situations. For example, the well-informed instructor should not hesitate to predict weather or future political events related to geography. When such predictions prove to be correct the mundane material included in the normal lecture takes on added significance in the eyes of the students. If the prediction should prove inaccurate explanations are in order. The student should be made to see that the prediction was made on the best available information, and that it went awry because of one or more extenuating circumstances. 7. Knowledge and experience to enable him to conduct appropriate field trips. Well planned, well led field trips are among the most enriching experiences which the geography student can have. Some concepts are never thoroly understood until the student has had an opportunity to *see*. 8. A desire to develop principles which will apply to many (all) different areas and situations. Geographers must indulge in research which will result in concrete, measurable results. Far too many geographers are concerned with, and deceived by, the glittering generality and lose sight of the precise and specific. Generalization is valid only when exact evidence is utilized to prove the generality. 9. A certainty that he is teaching the where of places, features, patterns, functions, associations or events. Location geography is frequently scorned by learned members of the profession, who consider it beneath their dignity to emphasize situation. The location of places is certainly not the end product of geography, but every geographer must be grounded in where before he can understand why. 10. Enthusiasm about his work. Zeal on the part

of the instructor generates enthusiasm on the part of the student. 11. An ability to present a well planned course. Most students are grateful for a concise and clear statement at the beginning of the course on what is expected of them. An outline of the course and a daily assignment sheet are helpful to the student. 12. A realization of his personal shortcomings. Every effort should be made to insure a thoro knowledge of subject matter, but at the same time every teacher should be aware that he does not know all there is to know about a given topic. If a student asks a question which stymies the professor, he should admit that he does not know the answer, but at the same time he should bend every effort to secure the answer before the next meeting of the class. 13. Make every effort to wean yourself away from notes. Review notes before class, but try to do without them in class. The students admire the professor who can think, organize and speak on his feet without the note crutch.

CONCLUSIONS

Many talents may be used by the instructor in a college or university, but the preceding list, if thoroly applied, will insure that the professor does an excellent job. Good teaching techniques must be applied by the geographer, since he has the dual task of training other geographers in a difficult discipline and, at the same time, overcoming the stigma of a bad reputation for dullness.

Fortunately, the nature of geography enables the qualified teacher to utilize many approaches and a variety of information. However, good teaching techniques are still necessary if geography is to survive and grow to its full stature as a university discipline.

SOME CAUSES OF DROUTHS IN THE GREAT PLAINS*

W. R. Stevens
United States Weather Bureau, Lincoln, Nebraska

Primary Causes of Rain

A flow of moist air over a region is a necessary but not sufficient condition for adequate precipitation. Drouths may develop while moist air is flowing across the land. Air over most deserts contains enough moisture to make them garden spots if the water vapor would condense and fall.

Precipitation is caused in one way only, that is, by the lifting of moist air. The lifting is necessary because the air is then cooled by expansion, and cooling decreases the capacity for water vapor. For example, a given volume of saturated air at 80° F. contains almost four times as much water vapor as the same volume at 40° F., and 22 times as much as the same volume at 0° F. Obviously, if moist air is forced to rise high enough, rain or snow will be precipitated in a generous amount.

Lifting the air is caused in three ways, namely: 1. flow across mountain barriers, 2. strong local heating which produces local convection currents to high levels and often results in the typical local summer thundershower and 3. flow of warm air over a dome of cold air; this is the frontal type of lifting.

Causes of Drouth

Flow of air across a mountain barrier leaves most of the precipitation on the windward side, while the lee side often receives inadequate moisture. The Great Plains are in the belt of prevailing westerlies, but no precipitation of consequence reaches the area from the Pacific because the mountain barriers to the west have extracted so much of the moisture. Furthermore, air from the Pacific descends in passing from the Rockies to the Plains, so it is being heated dynamically (by compression), and the capacity for water vapor increases with increasing temperature.

A large mass of cold air is dome-shaped. As it passes southward from Canada the edge of the cold dome is adjacent to relatively

* This short article first appeared in the *Bulletin* of the Nebraska Chapter of the National Council of Geography Teachers.

warm air to the south. Since the density of cold air is greater than warmer air, it underruns the warmer and forces it aloft (cold front). On the other hand, a cold dome of air may, after reaching the United States, move slowly eastward or even northward so that warm air flows over the dome from the south or southwest (warm front). Precipitation will result in either case if the lifting of the warm air is sufficient. In nearly saturated air, lifting of only a few hundred feet may be enough to cause clouds to build up to high levels and produce heavy rains.

As long as air is becoming warmer instead of colder, no rain will fall. Sometimes in spring and summer an ample supply of warm, moist air flows inland from the oceans, but the continent may be warmer. The warmer continent heats the air still more, thus increasing the capacity for water vapor. If there is no mass of cold air or mountains in the path of the warm air, it may blow across the country and curve into eastern Canada before it is forced upward over cold air.

One of the reasons for failure of rains in the Great Plains is the deflective force (Coriolis force) caused by the rotation of the earth. This force deflects every wind in the northern hemisphere to the right. Since the Gulf of Mexico is the origin of the moisture which falls in the Great Plains, moist air may start moving from the Gulf toward the Plains and be deflected eastward so that it flows up the Mississippi Valley and on to eastern Canada. If moist air from the Gulf is to reach the Great Plains, it must start moving northwestward across the West Gulf States gradually curving to the right. (For the moist air to reach Nebraska usually requires a low pressure center over Colorado later moving slowly eastward across Kansas.) Furthermore, this flow must occur at frequent intervals of time, and there must be frequent outbreaks of cold, or cool, air from Canada reaching the Plains and forcing the moist air to rise and release part of the moisture.

The atmosphere expands and contracts with changes in temperature. It expands upward over the continents in summer and contracts downward in winter; it reacts in the same way when it crosses warm or cold surfaces. When air leaves the relatively warm ocean and crosses a cold continent in winter, it shrinks to lower levels as it becomes colder, so there is less air at higher levels than over the ocean. Conversely, air expands upward when moving from a cold ocean to a warm continent. The air over Canada and Alaska

in winter becomes colder and more dense. This leaves less air in the upper levels, causing a "sink" over that area. Over the ocean to the west the air is relatively warm and expanded. Hence air at upper levels from the North Pacific flows rapidly into the "sink." It piles on top of the cold continental air, causing an increase in pressure over Canada and Alaska and a decrease over the ocean to the west. This phenomenon takes place mostly in high latitudes, because the contrast in temperature between ocean and continent is greater in the far north. In winter the air passing out over the Atlantic becomes warmer and piles up at high levels, thus reducing the movement in the upper air from the continent to the Atlantic. The result is that air is moving rapidly into the continent in the northwest and moving out slowly in the northeast. This continues until pressure in Canada is much greater than in the United States and the cold air is forced southward. The cold air is an obstruction to horizontal flow of warm moist air from the south. The warm air is forced upward, usually producing rain or snow. The same process happens at other seasons when conditions are favorable. It appears that these cold air masses from Canada are more frequent at any season when the Pacific is warmer than usual, or the continent is colder than usual. When the Pacific is not so warm, or the continent not so cold, overflow of air from the North Pacific is weak, and north to south movements of cold air less frequent, resulting in a diminution of rainfall in the Great Plains and over most sections east of the Rockies.

A relatively cold ocean to the west, as pointed out by Tannehill,[1] is probably the reason for the desert of the southwestern United States. When the temperature difference is especially large, it seems that the desert climate expands to the north and east.

Drouths in the Great Plains may be caused also by an extension of the large Bermuda high pressure system far to the west and slightly south of its normal summer position, so that warm, moist air from the Gulf of Mexico flows westward or west-northwestard into Mexico, causing heavy rains as it is forced to rise and pass over the Mexican Plateau. The air flow gradually curves to the right, passing northward west of the Continental Divide, then turning northeastward and releasing still more moisture as it crosses the Divide, then descending and moving across the Plains

[1] Ivan Ray Tannehill, *Drought*, Princeton University Press, 1947.

as a hot, dry southwest wind. Some of the long, dry intervals of the 1930s were caused by such a displacement of the Bermuda high pressure system.

TEACHING GEOGRAPHY AT CAMP

GEORGE L. MCDERMOTT
State Teachers College, Cortland, New York

Social, spiritual and recreational values of camping have become widely accepted as valuable adjuncts of a school curriculum. Five years ago in recognition of this, the Science Department of the State University Teachers College, Cortland, New York, introduced a course in Outdoor Science to be given under pioneer-like conditions. This course is conducted at a camp near Raquette Lake in the Adirondack Mountains.[1] The purpose of the course is to give science teachers-in-training the opportunity to learn the value of practical outdoor experience.

Altho the aim of the instruction at camp is not the teaching of any certain discipline, as such, much of what most students learn can be applied to many of his own fields of interest—be it geography, history, geology, recreation, wildlife, etc. This paper deals with the opportunities for learning and applying geographic principles and techniques in connection with a field camp.

In this camp there are no lectures or organized reports, but rather, on-the-spot suggestions and discussions as needs or opportunities occur. Campers are encouraged to observe, reason and carry on discussions in a search for answers to such basic questions as "What is it?" "Why is it here?" and "What is its relationship to its surroundings?"

MAKING CAMP

Three weeks prior to the beginning of school each fall, 15 college boys and girls converge on a small, remote, spider-shaped clearing on a peninsula jutting into Raquette Lake. Here, five miles from a road, they proceed to make a camp of tarpaulins, poles and rope. Most of these campers have never built a shelter—indeed, some have not even seen a tent before. By nightfall, in spite of the fact

[1] The camp property was a gift of Archer M. Huntington, a member of the council of the American Geographical Society.

that counselors help only by their suggestions, the clearing contains a variety of shelters. By the end of the second day fireplaces are built, wood corded, kitchen and storage tents erected, log work tables constructed, disposal pits dug and a weather station established. All projects are the outgrowth of a recognized need on the part of the campers and are of their own design. Whenever one method failed, another was tried; thus, the student learned by trial and error.

Field Activities

To promote maximum individual participation, ease of travel and equal sharing of responsibility, the campers are divided into groups of five. In each group a second or third-year camper serves as a counselor. Hikes and canoe trips are planned to include as many different aspects of the landscape as possible. As one group works in camp, another group is on an all-day canoe trip to study aquatic life, local history, hamlets and characteristics of nearby streams. The third group is on an all-day hike observing forest vegetation, logging operations, bogs and wave deposits. Over a period of three days each group has had similar experiences. Much of the daylight time spent at the campsite is devoted to necessary camp chores—food preparation, wood gathering, sanitation, etc.

At night, however, the campers do find time to consult books on nature and outdoor living in the camp library—a tent equipped with a gasoline lantern, their only modern convenience. In the early evening the entire group gathers around the campfire for singing and informal discussion of the day's activities. In case of rain, the program for the day continues as planned except that the evening campfire is held in a tepee.

As endurance builds up and knowledge of the outdoors increases, the trips become progressively longer. All-day canoe expeditions and hikes are extended to three-day canoe trips; and for the last trip, sleeping bags and food are packed for a five-day trip into one of the most rugged and picturesque parts of the Adirondack Mountains. The purpose in going to this area, some 50 miles from the base camp is twofold: 1. to acquaint the future New York teachers with the kind of marked trails and open-camp facilities maintained by their State Conservation Department and 2. to continue the many and varied learning and teaching opportunities in a whole series of new areas.

GEOGRAPHIC OBSERVATIONS

While in camp potential teachers have had many geographic experiences. He has observed and studied: 1. the weather; 2. the effect of elevation on climate as manifest in vegetation; 3. microclimates, their causes and their effect on plant growth; 4. plant associations and plant succession in cutover areas; 5. the physical characteristics of soil and its relationships to parent material, slope and vegetation; 6. lumbering operations from the selection of trees to be cut to the shipping of lumber from the saw mill; 7. rocks, minerals, glacial deposits, faults and other geological phenomena; 8. lakeshore features and characteristics of streams and their valleys; 9. land use in a mountainous region and 10. the function of mountain hamlets.

In addition, he has made use of: 1. topographic maps and compass in traveling, 2. simple pace maps, showing areal relationships and 3. a sundial and simple weather instruments.

Finally, each camper selects a nature project that will be his special field of study while at camp, such as a rock collection, edible plant collection, weather forecasting and others. The project permits the camper to expand his own interests which may well be geographic and, at the same time, to help others gain a knowledge of that one phase of nature lore.

CONCLUSION

Science Camp was designed primarily to provide an experience in outdoor living and nature lore. However, it has been found that many accomplishments and benefits of the camp lie outside of its original purpose. True, the campers have gained some factual knowledge about nature lore and have acquired certain skills of survival but more important are attitudes and a sense of reality toward their own special field of interest that have been formed as a result of their camping experience. It is hoped that the camp develops 1. a lasting love for the outdoors and all the adventure it holds, 2. a greater appreciation of our natural resources and a realization of a need for their conservation and 3. the desire to use informal outdoor field work as a part of teaching one's own special discipline.

RODERICK PEATTIE, 1891-1955

It would be completely inadequate to say that Roderick Peattie was a distinguished geographer whose reputation added luster to the Department of Geography at The Ohio State University where he was a member of the faculty for 35 years. His was a unique personality. He had a great capacity for friendship. Students commonly came to his office or called at his home to talk to him about their personal problems. He was sympathetic and understanding. The undergraduate who sought his counsel went away feeling that life was worth living.

Professor Peattie's more learned colleagues, schooled in the ways of traditional scholarship, were sometimes annoyed by the educational successes of this non-conformist. Much of his professional career was devoted to teaching and writing, to popularizing geography, making it interesting to his students and readers.

Professor Peattie came from a literary family and his own writings exhibit an imaginative quality so characteristic of the creative writer. His father, Robert Burns Peattie, was editor of *World-Herald* in Chicago. His mother, Elia Wilkinson Peattie, was for many years the literary editor of the *Chicago Tribune*. In this home of learning and culture young Roderick grew up. His younger brother, Donald Culross Peattie, is a distinguished literary figure in his own right.

Roderick Peattie was born on August 1, 1891, on the wind-swept western edge of Omaha, Nebraska. At the age of five he was taken to Chicago where he grew up in a suburban environment. He attended the University of Chicago and came under the influence of two distinguished teachers, Rollin D. Salisbury and Wallace W. Atwood. He graduated from the University of Chicago in 1914. After one year of graduate work at Chicago he went to Harvard University to study with Atwood and Professor Robert De Courcy Ward. It was under Professor Atwood that he wrote his dissertation on the Lower St. Lawrence Valley. He received the Ph.D. degree in 1920.

His full time teaching service began at Williams College where he taught for one year before coming to The Ohio State University in 1920. He served first in the Department of Geology but transferred to the Department of Geography in 1925 where all of the work in geography was consolidated. He taught at The Ohio State University for 35 years except for two years when he was abroad.

In 1927-1928 he and his family spent a year largely in France while he gathered material for a manuscript later to be published as *Mountain Geography*. He went to the Union of South Africa in 1944-1945 and worked for the Office of War Information.

His writings included more than fifty articles and several books. He will be remembered for his *Geography of Ohio, College Geography, Mountain Geography, Rambles in Europe, Geography in Human Destiny, How to Read Military Maps, Look to the Frontiers,* and *Struggle on the Veld.* In another place a full bibliography will be published.

In the summer of 1946 Professor Peattie suffered a slight stroke and in the autumn of that year his first wife, Margaret Rhodes Peattie died. From these two calamitous events he never quite fully recovered. He married Ruth Cavet Peattie in October, 1947. Two years ago they spent four months in west and central Africa daring to undertake a long journey when a more timid person would have stayed at home.

Death came quickly and quietly in the evening of June 18, 1955, in a hospital in Rutland, Vermont. Besides the widow he leaves three children, Roderick Elia Peattie, Chicago; Mrs. Anne Wood, New York City; Michael Ransome Peattie in Vermont; and two brothers, Edward Cahill and Donald C. Peattie. Only a few days before he was stricken he and Mrs. Peattie had arrived at West Hill, their summer place near Wallingford, Vermont. In writing of his mother he wrote in *The Incurable Romantic* that "Mother's ancestral story begins in Vermont, strangely, where I may spend my last days."

GUY-HAROLD SMITH

THE NATIONAL COUNCIL AT WORK

ANNUAL MEETING OF THE FORTY-FIRST YEAR

NOVEMBER 24-26, 1955, INDIANAPOLIS, INDIANA HOTEL CLAYPOOL

Thursday Afternoon and Evening

Hoosiers at Home, informal reception

Friday Morning GEOGRAPHY OPENS THE WAY **General Session**

Pathways, Perspective, and Progress at Elementary Levels—Edith Putnam Parker, University of Chicago

Cloverleaf Traffic and Thruway Patrol—Helen Mixter, Supervisor of Geography, Baltimore, Maryland

College Geography—An Educational Frontier—George T. Renner, Jr., Columbia University, Teachers College

SECTIONAL MEETINGS

A. Progress in Underdeveloped Countries

Recent Events in Honduras—Alford Archer, Bureau of Census, Washington, D.C.

Progress in the Philippines—Alden D. Cutshall, University of Illinois, Navy Pier, Chicago

The New Greenland—Trevor Lloyd, Dartmouth College, Hanover, New Hampshire

B. Dynamic Geography: What's New?

Yap, A Grass Skirt Civilization—John Wesley Coulter, University of Cincinnati

Caracas, A City Oil is Rebuilding—Mary Jo Read, Wisconsin State College, Milwaukee

Toward Unity in Europe: The Exchange of Hydroelectric Power Across International Boundaries—George W. Hoffman, University of Texas, Austin

A Mile Along Elmwood Avenue—Katheryne T. Whittemore, State University College for Teachers, Buffalo, New York

Friday Afternoon **General Session**

Creating Environments for Geographic Learnings—Eugenia Baxter, Carrol Township Schools, Washington County, Pennsylvania

SECTIONAL MEETINGS

Sections devoted to ways of adapting geographic learnings to all levels: primary, intermediate, secondary, and college

Meetings: Gamma Theta Upsilon, State Coordinators, and open sessions of several NCGT standing committees.

Friday Evening **Banquet**

Geographic Education and Teaching Method—Neville Scarfe, Dean of Education, University of Manitoba, Winnipeg

Saturday Morning **Joint Session**

National Council for the Social Studies and the
National Council of Geography Teachers

Some Essential Vitamins in Geographic Education—Clarence W. Sorenson, Illinois State Normal University, Normal

SECTIONAL MEETINGS

Enrichment Materials, Learning Units in the Curriculum, and Activities in the Program

ANNUAL BUSINESS MEETING

Saturday Afternoon

Field Trips and Excursions

The several sectional meetings provide for participation of members and guests. On these programs, the following people have accepted the various responsibilities listed. At the time this material was sent to press, the data were in the process of being completed. The final program copy will include many more participants.

Leaders of Sectional Meetings include:

Fred K. Branom, Department of Social Studies, Chicago Teachers College

Adelaide B. Blouch, Hayes School, Lakewood, Ohio

John C. Finney, Senior High School, Anderson, Indiana

Ruby M. Junge, College of Education, Michigan State University

Alan P. Mewha, State Teachers College, West Chester, Pennsylvania

Katherine Montgomery, Junior High School, Greensburg Pennsylvania

Panelists in Sectional Meetings include:

Emily H. Baker, Hadley Technical High School, St. Louis, Missouri
Irma Buell, Joliet Township High School & Junior College, Illinois
George S. Corfield, Nebraska Wesleyan University, Lincoln
Corrine Cowan, Elementary School, Greensburg, Pennsylvania
Howard Flierl, State University of New York College for Teachers, Albany
Erna G. Gilland, Consultant in Geography, California, Pennsylvania
Herman L. Nelson, Science Department, Iowa State Teachers College, Cedar Falls
Mary Viola Phillips, Senior High School, New Kensington, Pennsylvania
Marion H. Seibel, Supervisor, Elementary Education, Buffalo, New York
Eleanor E. Wiegand, Radburn School, Fair Lawn, New Jersey
Robert S. Weiner, Briarcliff Junior College, Briarcliff Manor, New York

Recorders in Sectional Meetings include:

H. Phillip Bacon, University of Pittsburgh, Pennsylvania
Merna Irene Fletcher, University of Missouri, Columbia
Lorrin Kennamer, Jr., East Texas State College, Commerce

Hoosiers on the *Hospitality Committee* include:

W. M. Bailey, Hendricks School, Marion; Sylvia Bird, North Anderson Junior High, Anderson; Daisy S. Buttgen, Douglas MacArthur School, Clear Lake; W. E. Campbell, T. W. Riley High School, South Bend; Paris R. Capron, Central Junior High School, Anderson; Robert Eisenbarth, Broadripple High School, Indianapolis; Martha Enyart, Public School #20, Indianapolis; E. O. Hanger, Frankfort High School, Frankfort; Floy Hurlbut, Ball State Teachers College, Muncie; Mildred Keesling, Central Junior High School, Anderson; G. David Koch, Indiana State Teachers College, Terre Haute; Norma Koch, Abraham Lincoln Junior High School, Indianapolis; Alfred Meyer, Valparaiso University, Valparaiso; Richard W. Mote, Public School #3, Indianapolis; Benjamin Moulton, Butler University, Indianapolis; D. Dorcas Orem, Highland School, Lafayette; Emmagrayce Peed, General Elementary Consultant, Indianapolis; Jeannette H. Scotton, Elementary grades, Pendleton; Otis P. Starkey, Indiana University, Bloomington; William Stevenson, Ball State Teachers College, Muncie; Gertha Sturgeon, Elementary Teacher, Logansport; Mary B. Taugher, Clark Junior High School, Vincennes; Mrs. Elgin Todd, Central Junior High School, Anderson; Frederick E. Van Ness, Washington School, Anderson; Alma Wagner, Dennis Junior High School, Richmond; Norma K. Zeis, Noblesville.

Also participating as *Hosts and Hostesses* are the following:

John A. Bonham, Junior-Senior High School, West Chester, Pennsylvania; Thelma Flavin, Crestwood School, Las Vegas, Nevada; Adah Flemington, New Trier Township High School, Winnetka, Illinois; Mary Grant, Morton Junior College, Cicero, Illinois; Wilma Gronstal, Lowell School, Waterloo, Iowa; Irene Ludvigson, Public Schools, Butterfield, Minnesota; Alice Wood Magee, Hyde School, Boston, Massachusetts; Lucille L. Paxton, City Schools, Greenville, Mississippi; Pauline Schwartz, State Teachers College, New Haven, Connecticut; Bonnie Mae Smith, Coordinator of Instruction, Lake Charles, Louisiana; Luella Specht, Simpson College, Indianola, Iowa; Grace Starlin, Junior High School, Newton, Kansas.

All members of the National Council should receive the complete program copy and details about field trips and registration in the Annual Fall Letter which will be in the mail late in September. I am looking forward to a visit with each of you at our meeting in Indianapolis!

M. MELVINA SVEC, *President*

GEOGRAPHICAL PUBLICATIONS

Glenn O. Blough. **Not Only for Ducks—The Story of Rain.** Whittlesey House, McGraw-Hill Book Co., Inc., New York, 1954. $2.25.

Mr. and Mrs. McBlossom of Showers Farm were delighted with the soaking spring rain because they realized the value of it. Their son, Mike, and his dog, April, were quite disgruntled at the sight of rain. It prevented Mike's flying his new green kite. He thought rain was "a nuisance and only for ducks."

The rain that fell in the city washed the streets and gutters, cleaned the air, watered plants and helped to fill the huge reservoir which supplied the city with water.

In the chapter "Rain in the Country," Mr. Blough gives an unusual explanation of gravity. Everything is pulled to or into the earth—roots; water; tiny streams are pulled down to lower regions where larger streams are formed. Water is pulled on and on to the lowest places.

Because of Mike's "liking for looking," he made many examinations with his magnifying glass. He observed especially the various stages of growth of the seeds and plants in his new garden.

Frequent trips to the woods and ponds where he saw various forms of life, and watching the steady growth of his plants made Mike realize the importance of rain. He was more impressed by its necessity when, during a long dry period, plant and animal life suffered. When the rain *did* fall, Mike and April were not only thrilled to *see* it, but they hurried out of doors so they could *feel* it.

The pictures by Jeanne Bendick are most informative and attractive.

First graders and first term second graders enjoy hearing this book read to them. Those in the last half of second grade and in the third grade can read it for themselves with pleasure.

Ethel Pace

Parkview Central School
Bedford, Indiana

Raymond E. Murphy, J. E. Vance, Jr. and Bart J. Epstein. **Central Business District Studies.** Economic Geography, Clark University, Worcester, Massachusetts, 1955. 100 pages with illustrations and bibliography. $3.00.

Central Business District Studies makes available in bulletin form reprints of a three-article series dealing with the CBD of the American city. In addition to reprints of the three articles which appeared in *Economic Geography*, the bulletin includes a select bibliography, containing "the more important references from the text and to these have been added other references that give a sample of what is being written regarding the District and its problems."

Also the bulletin contains a table "showing in detail the proportions of various specific land uses for each of the nine Central Business Districts and for an average of the nine."

Teachers who attempt to interest their students in their own local central business district thru both classroom and field experience will find this bulletin helpful.

Walter H. Voskuil. **Minerals in World Industry.** McGraw-Hill Book Co., New York, 1955. vii and 324 pp. including tables, illustrations, bibliographies and index. $5.75.

Even tho the modern world recently has been looking for adequate substitutes for several minerals, the author believes that we are going to become more rather than less dependent upon fuels, metals and other minerals. As those who are somewhat familiar with the iron and steel industry know, in spite of all the advances made in

the last few years, such as automation, minerals still form the basis for the economies of the world's highly developed regions.

Professor Voskuil's book employs statistics as skilfully as possible to illustrate this thesis. Two-thirds of the book is given to iron and steel and the fuels, with separate chapters on coal and petroleum in North America and iron in all the Americas. Iron and coal in Europe and oil in the Persian Gulf region are covered equally well. Among the other minerals adequately discussed are the plant foods—nitrogen, phosphates and potash.

Nuclear energy is considered in a properly conservative manner. Voskuil points out the many problems and difficulties involved in utilizing atomic power. Bell Laboratories' revolutionary battery for storage of solar energy, on the other hand, is only briefly discussed in two sentences and one wonders why foreign production was not mentioned in the chapter on natural gas.

There are about two dozen maps included in the book, most of them perhaps not quite worthy of inclusion. One world map, for instance, portends to show regions of phosphate production with three graduated circles, labeled United States, North Africa, and Pacific Islands—no values given. Another map locating world lead production uses graduated circles with values completely out of proportion to area. None of the maps has a scale.

On the whole, the book is well written and should prove useful to economic geographers and conservation teachers. Geographers will find one humorous but minor error, where, apparently, Argentina's export of corned beef has been misinterpreted (p. 309): ". . . Argentina converts corn into beef, which is frozen or canned for shipment abroad." This is mentioned as an example of how some Latin American countries process mineral or agricultural products for export.

ROBERT N. YOUNG

Stanford University

John Hunt. **Our Everest Adventure.** E. P. Dutton & Co., Inc., New York, 1954. 128 pages with photographs and maps. $3.75.

This is a pictorial account of the 1953 Everest Expedition with excerpts from Hunt's *The Conquest of Everest*.

It contains several photographs which were not published before. For instance, a picture of the Kangshung Glacier taken by Bourdillon thru a gap in the clouds, striking views showing details of the terrain above South Col and the plateau of South Col. In all, over 150 pictures portray every phase of the expedition.

Unfortunately, the reproductions of the excellent photographs, often taken in severe conditions, are not clear. Most of them have an unpleasing tone. The gradations of tone of rock faces and human faces are completely blacked out on several pictures. Also, some of the photographs have been cut in reckless fashion so as to omit the interesting sections.

The book is organized under eight heads: March to Khumbu; Rehearsals; Icefall; Western Cwm; Lhotse Face; South Col; South Peak and the Summit by Hillary. The text is clear. The layout, however, is poor. Account of the final assault is so laid out that it is not clear where Hillary stops and Hunt resumes. The maps are poor. The main map does not even locate the South Col.

Nevertheless, the fascinating account of the Everest, South Face, Western Cwm, Lhotse Face and the dramatically highlighted final assault make an exciting story. *Our Everest Adventure* is especially suited for the use of high school students. It is a shorter version of Hunt's *The Conquest of Everest* brought to life by photographs.

PRADYUMNA PRASAD KARAN

Patna University
India

Henry F. Becker. **Florida: Wealth or Waste?** Florida State Department of Education, Tallahassee, 1954. xvi and 176 pp. with maps, pictures, tables, graphs and index. $1.80.

Florida: Wealth or Waste?, prepared by a group of public school teachers and principals under the direction of Professor Henry F. Becker of Florida State University, is a revision of a text that was first published in 1946. This new edition, written for Florida's high school civics classes, was sponsored by the Florida Resource-Use Education Committee. The many excellent maps, tables and graphs have been brought up-to-date by drawing upon recent statistical data and the textual material has been completely rewritten. While some of the rather detailed information found in the earlier edition has been omitted, it has by no means made it a less useful book. It is both readable and informative and will appeal to students as well as to the general reader interested in Florida and its resources. Teachers will welcome the recommendations for further study found in every chapter. These suggestions will aid classes in making use of the home community in studying local resource-use problems.

This book is designed to show students the necessity of a thoro examination and evaluation of the way in which man is utilizing the resources. Topics considered include: Florida's people, forests, specialized farming, general farming, beef production, land use problems, mineral production, sea resources, manufacturing and the tourist industry. Historical perspective has been wisely included in the discussion of these topics.

Well written and skillfully organized, this book is one of the better examples of the type of material that can be prepared by teachers who have come to understand the need of a place for resources and their management in the curriculums of our schools.

H. Phillip Bacon

University of Pittsburgh

Rehabilitation and Development of Agriculture, Forestry and Fisheries in South Korea (Report Prepared for the United Nations Korean Reconstruction Agency by a Mission Selected by the Food and Agriculture Organization of the United Nations.) Columbia University Press, New York, 1954. xviii and 433 pages with tables, charts and maps. $8.75.

The political division of Korea following World War II separated an industrial north from an agricultural south. A greatly increased population coupled with war damage in 1950 created grave problems in food supply. This book is the work of eleven specialists who each spent 400 days in field work in the country during 1952 and 1953, investigating problems in agriculture, forestry and fisheries. Their recommendations are based upon a thoro knowledge of the country. The role that technical education must play in the development of South Korea is emphasized.

The authors reduce the problem to its essentials. They point out that, "temporary palliatives, such as land reform and redistribution of holdings, cannot mask the fact that there is a limit to the density of people which the land can directly maintain let alone provide with a reasonable standard of living." The authors expect South Korea to be able to feed its people by 1956. However, they venture the opinion that by 1959 the high rate of population increase will negate the expected benefits of their recommendations, and in the years to follow the gap between demand for food and its production will widen. The benefits of technology are indeed transitory in the face of human fertility.

This is a good source book on South Korea. The multiauthorship results in low readability and much repetition. But it is an informative book, with a useful table of contents which enables the reader to find the answers to many significant questions.

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EDITORIAL NOTES AND NEWS

Are you familiar with both *Social Education* and *Science Education*? Both magazines have helpful articles for geography teachers. Since geography consists of both the physical (or natural) and the cultural environments, a good geography teacher is interested in and uses information about both the social studies and science. *Social Education* is the official magazine of the National Council for the Social Studies and *Science Education* is the official organ of the National Association for Research in Science Teaching. Dr. Clarence M. Pruitt, 304 Walnut Street, Stillwater, Oklahoma is Editor of *Social Education*. The Twenty-Eighth Annual Meeting of the National Association for Research in Science Education was held at Teachers College, Columbia University, April 18-20, 1955.

Have you seen the new filmstrips series sponsored by The American Geographical Society? *Color Filmstrips on the Geography of the World Series 1* contains 10 strips as follows: 1. "The High Plateaus of Utah" by Richard F. Logan; 2. "The Central Valley of California" by R. S. Funderburk; 3. "Western Montana" by Fred S. Honkala; 4. "Puerto Rico" by J. H. Mitchelhill; 5. "Honduras—The Banana Republic" by John W. Green; 6. "Agriculture in the Philippines"; 7. "The Philippines—Land and People," filmstrips 6-7 by Alden Cutshall; 8. "Regional Contrasts in Southwest Germany" by George M. Howe; 9. "The Historical Geography of Southern Italy" by Robert McNee and 10. "Mount Carmel and Haifa (Israel)" by Saul B. Cohen. The series is distributed by Herbert E. Budek, Inc., Hackensack, New Jersey. A hard-covered notebook explaining the films is sent complete without additional charge upon the purchase of one filmstrip or the series.

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EDITORIAL NOTES AND NEWS

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EDITORIAL NOTES AND NEWS

"Ol' Man River" continues to force mere humans to find answers to many difficult problems. Its floods and ever shifting bed are always serious threats to underwater pipe lines. To eliminate such dangers and assure constant service, the world's longest pipeline bridge will carry two 30 inch gas pipe lines across the Mississippi near Grand Tower, Illinois and Whittenburg, Missouri. The main span will be 2,150 feet long and 75 feet above flood stage of the river. The overall length is 3,690 feet. The cost will be approximately 3.25 million dollars.

Have you seen a map showing the location and distribution of Gamma Theta Upsilon chapters in the United States? Illinois and Pennsylvania have five chapters each. Ohio and Oklahoma have three chapters each. If you are interested in this national professional geography organization, write to Professor Byron Barton, Chairman, Department of Geography, Eastern Illinois State College, Charleston.

Electronics, responsible for so many noteworthy achievements in industry, and the DuKane Corporation of St. Charles, Illinois, stepped into the field of progressive educational research on January 23, 1955 with an announcement by Herman B. Wells, President of Indiana University, that a quarter million dollars, industry-sponsored school planning institute and laboratory will be established in Bloomington. The institute which was hailed as a tremendous forward step in education by Wendell W. Wright, dean of the university's school of education, was planned by Dr. Darell Boyd Harmon, consulting educationist and DuKane's technical consultant, to find better ways of building and equipping the 820,000 classrooms estimated as needed by 1960.

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The author has made a special point of including a good discussion of place geography. He has listed locations for the significant producers of the world's major commodities, and after each chapter has included an examination of the value of each region to the various world powers.

A large amount of descriptive material and illustrations—maps, graphs, and photographs—has been included, and an annotated bibliography provided for each chapter. Cartography for the book is the work of Jameson MacFarland. *1955, 582 pages. $6.50.*

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By P. H. KUENEN, Professor of Geology, University of Groningen, The Netherlands. A sound but lively account of the various aspects of physical geography, geology, oceanography and glaciology as they apply to the movement of water. *1955. Approx. 320 pages. Prob. $5.25*

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